

In re Application of HENKENS et al.
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AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1. (Currently amended). A battery or AC-powered portable circuit board biosensor apparatus comprising:

a circuit board with a plurality of working and reference electrodes formed thereon;

a plurality of nucleic acid segments attached to the surface of said plurality of working electrodes that capture nucleic acid targets by hybridization; and

a monitor for measuring a current produced following hybridization of targets with the nucleic acid segments, said monitor being operably connected so that it controls the electrical potential of the electrodes and records, analyzes and displays the currents generated at the individual electrodes. when an electric potential is applied to the working electrode when the attached nucleic acid segments hybridize to nucleic acid targets wherein

Claim 2. (Currently amended). The portable biosensor apparatus of claim 1 wherein the circuit board is a printed circuit board or a screen printed circuit board or has a combination of printed and screen printed elements.

Claim 3. (Currently amended). The portable biosensor apparatus of claim 2 further comprising a multiplexed potentiostat to apply electrical potential and to measure the current generated by each of said nucleic acid segments following hybridization hybridized to different target nucleic acids.

Claim 4. (Currently amended). The portable biosensor apparatus of claim 1 wherein the monitor is a continuous or pulse amperometric monitor.

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Claim 5. (Currently amended). The portable biosensor apparatus of claim 4 wherein the pulse amperometric monitor comprises measures the currents generated by the elements of a dual sensor array with one or more working electrodes associated with a single reference electrode and that simultaneously detects and quantitates a plurality of targets.

Claim 6. (Currently amended). The portable biosensor apparatus of claim 5 wherein the amperometric monitor comprises pulse and intermittent pulse modes.

Claim 7. (Currently amended). The portable biosensor apparatus of claim 1 further comprising an ~~electrochemical pulse analyzer~~ amperometric monitor operably linked to said plurality of electrodes so that currents at individual working electrodes are independent of each other.

Claim 8. (Currently amended). The portable biosensor apparatus of claim 1 further comprising a touch memory chip to upload calibration curves and controlling parameters to the monitor.

Claim 9. (Currently amended). The portable biosensor apparatus of claim 1 further comprising a liquid crystal display and an output port that enables data transfer to an external device.

Claim 10. (Currently amended). The portable biosensor apparatus of claim 1 further comprising an integrated microprocessor for changing parameters, saving and analyzing data.

Claim 11. (Currently amended). The portable biosensor apparatus of claim 1 further comprising a single-key start operation.

Claim 12. (Cancelled).

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Claim 13. (Currently amended). The portable biosensor apparatus of claim 1 wherein the nucleic acid segments are hybridized with single strand DNA generated from an amplified RNA or genomic DNA sample digested with an exonuclease.

Claim 14. (Currently amended). A battery or AC-powered portable biosensor apparatus comprising:
a circuit board with a plurality of working and reference electrodes formed thereon;
a plurality of nucleic acid segments attached to the surface of said plurality of working electrodes that capture nucleic acid targets by hybridization, wherein each ~~of said plurality of nucleic acid segments is hybrid formed~~ has one or more labels attached that catalytically enhance the current generated following hybridization; and
a monitor for measuring the currents produced following hybridization of targets with the nucleic acid segments, said monitor being operably connected so that it controls the electrical potential of the electrodes and records, analyzes and displays the currents generated at the individual electrodes, labeled and selectively hybridizes to different target nucleic acids.

Claim 15. (Cancelled).

Claim 16. (Currently amended). The biosensor apparatus of claim ~~[[15]]~~ 14, wherein the nucleic acid segments are hybridized with single strand DNA generated from an amplified RNA or genomic DNA sample digested with an exonuclease.

Claim 17. (Withdrawn). A candidate drug that modulates cell function wherein said candidate drug is identified by the following steps, comprising,
(a) incubating a candidate drug with a culture of selected cells;
(b) extracting nucleic acids from said cells;
(c) contacting the nucleic acids of step (b) with the circuit board biosensor apparatus of claim 1;
(d) applying a pulsed electrical potential to the array; and

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(e) comparing the current produced from selected hybridized nucleic acids extracted from a culture of said selected cells with and without the candidate drug wherein the difference in current produced is indicative of a candidate drug that modulates cell function.

Claim 18. (Withdrawn). The candidate drug of claim 17 wherein the amount of current generated is indicative of drug candidate interaction with said selected nucleic acids produced by the selected cells.

Claim 19. (Withdrawn). The candidate drug of claim 17 wherein the selected nucleic acid is a mRNA.

Claim 20. (Withdrawn). The candidate drug of claim 17 wherein the selected nucleic acid is from a pathogenic organism.

Claim 21. (Withdrawn). The candidate drug of claim 17 wherein the selected nucleic acid is from a cancer gene.

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